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BAUSCH & LOMB



POLARIZING
MICROSCOPES



BAUSCH & LOMB OPTICAL CO.
ROCHESTER 2, NEW YORK



POLARIZING MICROSCOPES with BAUSCH & LOMB

NOW

SERIES S

THE STANDARD MODEL

This brilliant, new line of *Dynoptic* Polarizing Microscopes includes the Model LS-2, especially designed for routine student instruction in geology, petrography, mineralogy, crystallography, paleontology, and microchemistry.

Now, *because of the extremely low cost*, schools can own several polarizing microscopes of recognized, standard design, with features found only on more expensive instruments. When the student becomes familiar with the operation of the Series S *Dynoptic* Model, the transition to more advanced equipment and procedure is easily effected. *He is already familiar with accepted microscope techniques.*

Here are the features which make this the best Student Polarizing Microscope buy:

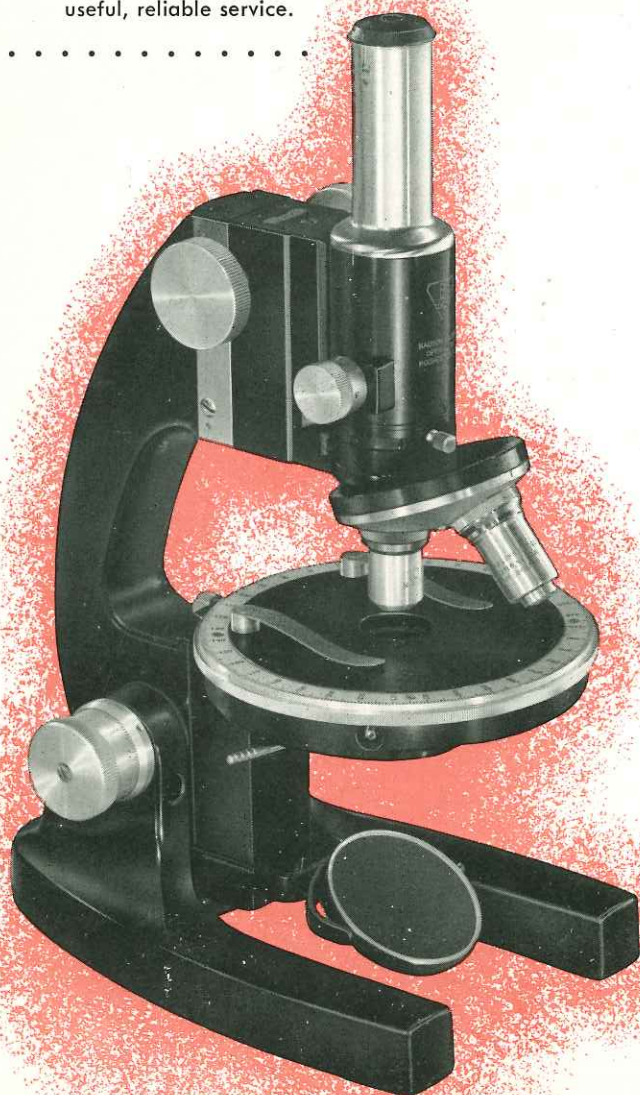
The *Dynoptic*, ball-bearing, low position fine focusing stand on Bausch & Lomb Polarizing Microscopes

The world's easiest fine focusing microscope

New Models: Series S, I, and M, built with this widely accepted, most recent improvement in microscopes

In addition to the new, superbly performing mechanical design, these instruments are fitted with Bausch & Lomb optical elements, which have long been the accepted standard of the world.

These are precise optical tools, built to last a lifetime of useful, reliable service.



EYEPIECE—Keyed Huygenian 10×, with durable crossline reticule. Easily cleaned. Focusing crosshair eyepieces can be substituted at additional cost. See accessories.

COARSE ADJUSTMENT—Standard design, same as on most expensive laboratory type microscopes.

FINE FOCUSING ADJUSTMENT—*Dynoptic* design, modern ball-bearing and roller all the way. Friction-free, effortless focusing for a lifetime of use. One micron graduations, most precise focusing obtainable. Low position knob permits resting the hand on the table, permitting fatigue-free operation even over extended periods of time.

ANALYZER—Polaroid, flip-in type, dustproof. Just turn the knob a quarter turn. Saves time, no exposed greasy slideways to catch dust. Fully enclosed and protected from damage.

SLOT FOR ACCESSORIES—With dustproof shutter, for acceptance of standard retardation plate, etc. See accessories.

NOSEPIECE—New design, Rotosphere, ball-bearing double, for long life and assured centricity. Ball-stop insures accurate positioning of objective. Compensator distributes pressure to all bearing points cancelling effects of wear, should any ever develop. Centerable type nosepiece can be substituted at added cost. See accessories.

OBJECTIVES—10× achromatic, strain-free, 0.25 N.A. color coded to assist beginner in easy identification, and 45× achromatic, strain-free, 0.85 N.A. Additional objectives are available. See accessories.

STAGE—Series S, ball-bearing, graduated in 1 degree, precentered and rotatable, with index line. The same smooth operation as was formerly available only on research type instruments. Permanently lubricated with built-in wear compensator. Drilled and tapped for attachment of mechanical stage. See accessories.

SIMPLIFIED SUBSTAGE—Fixed Polaroid Disc with iris diaphragm. Plano-concave mirror in quick on and off tuning-fork mount. Can be furnished with Opti-lume integral substage illuminator, instead of mirror at slight added cost. See accessories.

Dynoptic Polarizing Microscope, Model LS-2. Monocular tube; rack and pinion coarse adjustment; ball-bearing and roller low position fine adjustment, graduated in one micron divisions; ball-bearing, revolving, double nosepiece; plano-concave mirror with tuning-fork mount; ball-bearing, graduated, precentered, rotatable stage, with index line; stage clips; slot for retardation plates, etc.; flip-in, dustproof, fixed Polaroid analyzer; fixed Polaroid polarizer with iris diaphragm; one 10X, 16mm, 0.25 N.A., color-coded, achromatic, and one 45X, 4mm, 0.85 N.A., achromatic, strain-free objectives; keyed 10X Huygenian eyepiece with crossline reticule; cabinet not included. Cat. No. 31-28-59-02. \$304.50

BAUSCH & LOMB DYNOPTIC BALL-BEARING STAGE

SERIES I

THE INTERMEDIATE MODEL

A complete Polarizing Microscope designed for comprehensive work in advanced student instruction, and, industrially, for precise quality and production control. It can be expected that research will develop new uses and applications for Polarizing Microscopes. The versatility of the Series I design will meet these new demands. A comparison of the cost of this fine instrument with any other available, will convince you that nowhere can you get more for your money. *Note these new quality features:*

EYEPIECES—Huygenian, 7.5× and 10× keyed, with crosshairs and focusing eyelenses. A 5× eyepiece can be substituted for either at no added cost.

BERTRAND LENS—Fixed focus, for examination of interference figures with the 45× objective. Improved design. Flip-in, dust-proof, and accident proof. Fast operation, just give the knob a quarter turn.

CENTERABLE NOSEPIECE—New design assures repeat centrations of objectives with hitherto unattainable precision.

OBJECTIVES—10×, 0.25 N.A., and 45×, 0.85 N.A. achromatic and strain-free.

STAGE—Series I, ball-bearing, graduated in 1 degree, precentered, rotatable; clamping screw; vernier reading to 6' of arc. Drilled and tapped for attachable mechanical stage. See accessories.

CONDENSER-POLARIZER SUBSTAGE—Iris diaphragm, heat-absorbing filter. Polaroid polarizer and two condensing lenses. Instantly Variable Focus from 0.08 N.A. to 1.25 N.A. without inconvenience of removing or swinging-out upper lens element. No auxiliary lens or additional condenser is required to increase the numerical aperture for oil immersion objectives. Polarizer is rotatable through 360 degrees.

PLUS—Bausch & Lomb standard coarse adjustment; *Dynoptic* design ball-bearing and roller fine adjustment; dustproof, flip-in analyzer; dustproof slot for retardation plates, etc., on modern design *Dynoptic* Stand. For wedge, plates, additional optics, and attachable illuminators, see accessories.

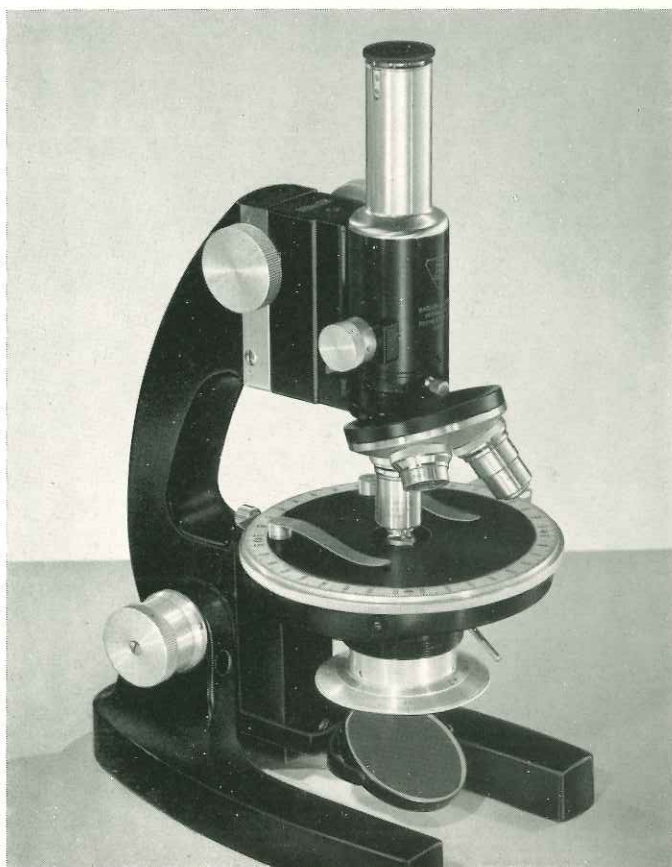
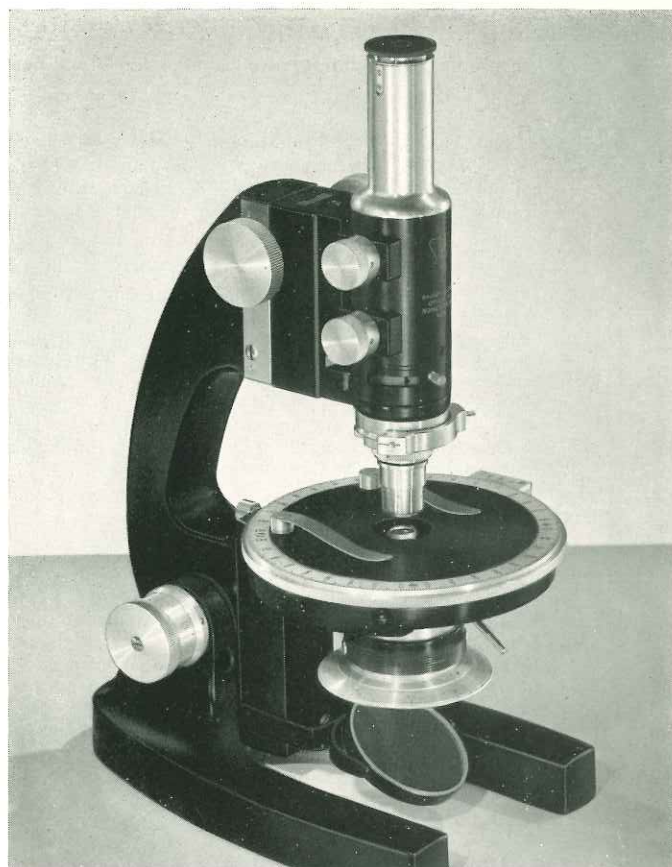
SERIES M

FOR CHEMICAL MICROSCOPY

While primarily designed for chemical microscopy, the Series M with proper accessories can also be used for metallography, biology, textile, and paper analysis, particle size determination, photomicrography and many other applications involving quality and production control.

Optical and mechanical equipment will vary according to specific application. The instruments in this series can be equipped with either the Series S or Series I rotatable stage; double or triple revolving nosepiece; or centerable nosepiece.

The optical and mechanical equipment should be selected to suit the particular use to which the instrument will be put. Give Bausch & Lomb full information about the intended application and you will receive expert recommendations as to specific equipment. Your microscope will be "tailor-made" to the required application. For wedge, plates, and attachable illuminators, see accessories.



AND PLUS THE WORLD'S FINEST OPTICS

SERIES I

Dynoptic Polarizing Microscope, Model LI-2. Monocular tube; rack and pinion coarse adjustment; ball-bearing and roller, low position fine adjustment, graduated in one micron divisions; centerable nosepiece; plano-concave mirror with tuning-fork mount; ball-bearing, graduated, precentered, rotatable stage with vernier reading to 6' of arc; stage clamping screw; stage clips; slot for retardation plates, etc.; flip-in, dustproof, fixed Polaroid analyzer; flip-in, dustproof, fixed Bertrand lens; Variable Focus Condenser, 0.08 N.A., to 1.25 N.A., with iris diaphragm; graduated and rotatable Polaroid Polarizer; one 10X, 16mm, 0.25 N.A., and one 45X, 4mm, 0.85 N.A., achromatic, strain-free objectives; two objective holders; one 7.5X and one 10X Huygenian eyepieces with crosshairs and focusing eyelenses; in wood cabinet. Cat. No. 31-28-60-02. \$477.00

Dynoptic Polarizing Microscope, Model LI-4. Same as above catalog #31-28-60-02, but with one 2.6X, 40mm, 0.08 N.A., one 10X, 16mm, 0.25

N.A., and one 45X 4mm, 0.85 N.A. achromatic, strain-free objectives; three objective holders; one 5X, one 7.5X, and one 10X Huygenian eyepieces with crosshairs and focusing eyelenses. Cat. No. 31-28-60-04. \$523.00

SERIES M

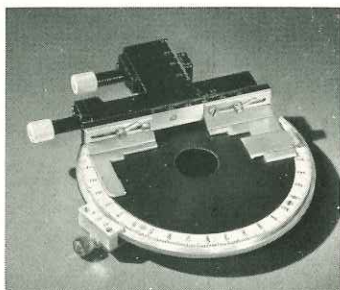
Dynoptic Polarizing Microscope, Model LM-4. Monocular tube; rack and pinion coarse adjustment; ball-bearing and roller, low position fine adjustment, graduated in one micron divisions; ball-bearing, revolving, triple nosepiece; plano-concave mirror with tuning fork mount; ball-bearing, graduated, precentered, rotatable stage with vernier reading to 6' of arc; stage clamping screw; stage clips; slot for retardation plates, etc.; flip-in, dustproof, fixed Polaroid analyzer; Variable Focus Condenser, 0.08 N.A. to 1.25 N.A., with iris diaphragm; graduated, rotatable Polaroid polarizer; one 4X, 32mm, 0.10 N.A., one 10X, 16mm, 0.25 N.A., and one 21X, 8mm, 0.50 N.A. achromatic, strain-free objectives; one 5X, one 7.5X, and one 10X Huygenian eyepieces with crosshairs and focusing eyelenses; in wood cabinet.

Cat. No. 31-28-65-04. \$454.00

ACCESSORIES FOR DYNOPTIC POLARIZING MICROSCOPES

MECHANICAL STAGE

This versatile stage is readily attachable to all Bausch & Lomb Polarizing Microscopes of recent manufacture. Standard petrographic 26 x 45mm, as well as biological 25 x 75mm slides can be accommodated by fingertip adjustment. Can also be supplied as a Point Counting Stage (Chayes' Method), the knobs being provided with ratchet wheels which move the slide 0.31mm per each click in the east-west direction, and 0.51mm per each click in the north-south direction.



Catalog No.	Description	Price
31-59-47	Mechanical Stage, attachable, graduated.	\$ 80.00
	Point Counting Stage.	105.50

OPTI-LUME INTEGRAL ILLUMINATOR

For the utmost in convenience these microscopes can be supplied with the new Opti-lume Integral Illuminator. This compact, efficient source with its bracket replaces the mirror and furnishes a wealth of light of uniform intensity over the full field. Its aluminized reflector and spherical condenser give three times the light delivered by older illuminators of this type. Louvers provide ventilation and assure the cool stage so necessary for Becke Line Tests. If desired, the Opti-lume can be easily detached and used with a mirror as a separate light source. Plugs into any 115-volt, 60-cycle line. See listing below for mirror.



Catalog No.	Description	Price
31-33-02-32	Opti-lume	\$9.00
31-58-20	H-Bracket for attaching Opti-lume in place of mirror If on any Dynoptic Polarizing Microscope the Opti-lume is desired in place of the mirror, deduct \$8.00 for the mirror and tuning-fork bracket, and add the cost of the Opti-lume and H-Bracket.	3.00
31-31-15	Renewal 15-watt lamp for above, Inc. Tax.	.23
31-50-21	Mirror, plano-concave.	7.00
31-58-19	Tuning-fork bracket for mirror.	1.00

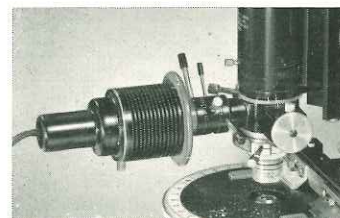
FOCUSING TELESCOPE AND PINHOLE CAP

The focusing telescope is used for most efficient viewing of interference figures with the Series S and Series M Dynoptic Polarizing Microscopes when a Bertrand lens is not supplied. The pinhole cap can be used with the 45X objective for interference figure observation when both the Bertrand lens and focusing telescope are unavailable.

Catalog No.	Description	Price
31-50-78	Focusing Telescope.	\$21.00
31-50-24	Pinhole Cap, standard diameter.	4.00

ACCESSORIES FOR REFLECTED LIGHT

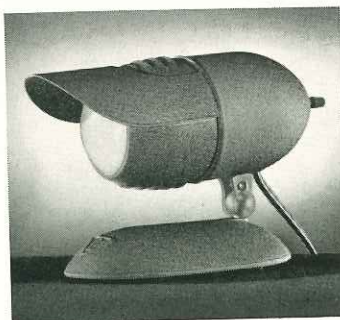
For examination of opaque ore minerals and metallurgical samples, etc., the following are required accessories to permit viewing with polarized, reflected light. They can be readily attached to any one of these Dynoptic Polarizing Microscopes.



Catalog No.	Description	Price
31-34-43-11	Vertical Illuminator with quick change, centering nosepiece; coated clear glass reflector; half aperture prism; field and aperture diaphragms; green filter; illuminating unit, with adjustable transformer for use on 115-v., 60-cycle A.C.	\$173.00
31-34-43-12	Same as Catalog #31-34-43-11 above, but with fixed transformer.	\$171.00
31-31-39	Renewal 6.5-v. lamp for above, Inc. Tax.	1.95
31-34-95	Polaroid Polarizer, fits in side tube on #31-34-43-11 and #31-34-43-12 Vertical Illuminators	17.00
	Strain-Free, Balcoted Achromatic objectives, corrected for use at 215mm tube length without cover slips. For Vertical Illuminator.	
42-33-53	10X, 0.25 N.A.	39.00
42-33-56	40X, 0.65 N.A.	65.00
31-34-36	Compensating Lens for mounting in Vertical Illuminator. Must be ordered to permit use of above objectives on microscopes of standard 160mm tube length, such as the Dynoptic Polarizing Microscope	9.00

MICRO-LITE ILLUMINATOR

This is a separate light source which provides abundant sub-stage illumination. The 60-watt lamp is standard commercial type available wherever lamps are sold. Condensing lens with ground surface and a blue filter are provided for balanced, evenly diffused light. Built-in switch and 6' of cord are included. Stable base has felt pads to prevent scratching table surface.



Catalog No.	Description	Price
31-33-01-01	Micro-Lite	\$9.50
71-71-13	Renewal Lamp 60-watt for above, inc. Tax.	.18

NOSEPIECES

Catalog No.	Description	Price
31-19-31	Centerable Nosepiece, tube part	\$25.00
31-19-32	Objective Holder for centerable nosepiece (must be ordered separately for each objective, except those furnished as regular equipment)	10.00
31-19-22	Nosepiece, Rotosphere, double	15.00
31-19-23	Nosepiece, Rotosphere, triple	18.00

HUYGENIAN EYEPIECES

Catalog No.	Description	Price
31-15-21	5X, Keyed, focusing eyelens, crosshairs	\$18.00
31-15-23	7.5X, Keyed, focusing eyelens, crosshairs	18.00
31-15-25	10X, Keyed, focusing eyelens, crosshairs	18.00
31-15-29	10X, Keyed, with crossline reticule	10.00
31-15-17	7.5X, with focusing eyelens, to take disc	12.00
31-16-05	Micrometer Disc, 5mm, ruled to 0.1mm	6.00
31-16-90	Stage Micrometer, glass, ruled to 0.1mm at 0.01mm for transmitted or reflected light	18.00

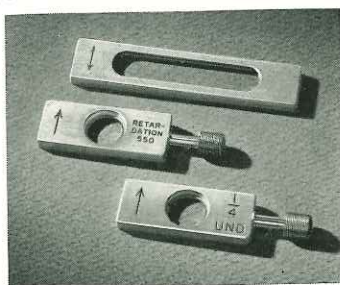
STRAIN-FREE ACHROMATIC OBJECTIVES

Corrected for use at 160mm Tube Length, and With 0.18mm Cover Slips.

Cat. No.	Mag.	E.F. (mm)	N.A.	Free Working Distance (mm)	Influence of departure from cover slip thickness of 0.16mm to 0.18mm	Used For	Price
31-09-07-01	2.6X	50	0.08	43.5	None	Scanning, birefringence, refractive index	\$18.00
31-09-09-01	4X	32	0.10	38.0	None	Scanning, isotropy and anisotropy	18.00
31-09-18-01	6X	22.7	0.17	15.5	None	Scanning	26.00
31-09-20-01	10X	16	0.25	7.7	None	Isotropy, anisotropy, refractive index, birefringence	26.00
31-09-27-01	21X	8	0.50	1.6	Noticeable	Interference figures, sign of birefringence	37.00
31-09-31-01	45X	4	0.85	0.3	Pronounced	Interference figures, sign of birefringence	39.00
31-09-71-02	97X	1.8	1.25	0.13	Very Little	High magnification and high resolving power	70.00
31-09-73-02 (Fluorite)	98X	1.8	1.30	0.13	Very Little	High magnification and high resolving power	143.00

RETARDATION PLATES AND QUARTZ WEDGE

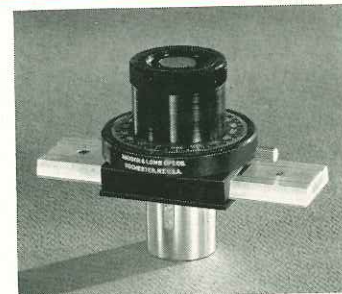
These polarizing accessories which fit into the tube slot of the Dynoptic Polarizing Microscopes, are required to determine the characteristics of any optically active crystal. The quarter-wave retardation plate is generally used to determine the sign of birefringence, i.e., whether the crystal is positive or negative. The quartz wedge may also be used for this purpose. To increase the intensity of color of weakly birefringent crystals, the first order red or full wave plate is used. With the quartz wedge the amount of birefringence is estimated.



Catalog No.	Description	Price
31-51-54	Retardation Plate, Quarter-Wave, 147 mμ	\$11.00
31-51-56	Quartz Wedge, I through III order	63.00
31-51-60	Retardation Plate, full wave, first order red, 550 mμ	15.00

EYEPIECE BIREFRINGENCE MEASURING ACCESSORIES

When a very accurate measurement of birefringence is required these accessories are suggested. The Calibrated Quartz Wedge measures the amount of birefringence directly in millimeters. Retardation is measured with the quarter-wave plate, Cat. No. 31-51-54, and graduated Cap Analyzer. If the retardation is greater than 1/2-wave-length the graduated quartz compensator is recommended.



Catalog No.	Description	Price
31-51-41	Universal Holder and Positive Eyepiece	\$ 58.00
31-51-42	Quartz Compensator, graduated	150.00
31-57-48	Polaroid Cap Analyzer, rotatable and graduated	52.00

VERTICAL, WOOD, STORAGE CABINETS

Catalog No.	Description	Price
31-39-96	Standard, for Model LS Dynoptic Polarizing Microscope; handle, lock and key	\$18.00

Catalog No.	Description	Price
31-39-78	Deluxe, for Models LI and LM Dynoptic Polarizing Microscopes; fitted with accessory container for retardation plates, wedge, extra objectives and eyepieces; handle, lock and key	\$28.00

TERMS AND PROCEDURE

CATALOG NUMBERS

When ordering, be sure to give catalog number and name of item.

FINANCIAL STANDING

To avoid delay, a purchaser with whom Bausch & Lomb has not previously transacted business should accompany his first order with commercial references or remittance in cash.

TRANSPORTATION CHARGES

Unless otherwise stated on a B&L quotation, all consumer purchases, except repairs, will be shipped transportation charges prepaid to any point within Continental United States of America. Other-than-consumer purchases, all repairs, and goods for delivery outside the above specified area will be shipped f.o.b. Rochester, N. Y., U. S. A. The shipping charges on products sent on memorandum are not prepaid. There is no charge for packing unless otherwise stated. Products made on special order cannot be forwarded C.O.D.

SHORTAGE OR DAMAGE

To avoid error, Bausch & Lomb exercises the utmost care in checking and packing all shipments. All packing should be carefully examined for small items. If a discrepancy is found, report it to Bausch & Lomb immediately. Report to the transportation company at once any claim for loss, damage or breakage. Carriers are responsible for loss or damage to goods in transit. When shipping container shows damage, do not give a clear receipt, but sign for "in bad order". Save the container and obtain an inspection report from the carrier.

RETURNING GOODS

If it is desired to return goods, first send Bausch & Lomb full information by letter. Goods should not be returned for any reason until approval for their return has been received from Bausch & Lomb. Each item should be plainly tagged with sender's name and address. Identification tags will be sent on request.

ELECTRICAL EQUIPMENTS

Electrical equipments for use on voltages other than those listed are available on special order. Send complete specifications for quotations.

INQUIRIES

When writing, please give the date of your order, the Bausch & Lomb order number which appears on the packing slip and, if possible, the Bausch & Lomb invoice number.

PRICES

Prices are subject to change without notice. Orders are subject to acceptance at Rochester, N. Y., U. S. A., at prices prevailing at time of shipment. Orders for standard items may be cancelled if not wanted because of price advance. Excise taxes or other governmental charges will be added wherever applicable. Shipments to points outside Continental United States of America and to its territories, dependencies and possessions, except Hawaii and Alaska, are not subject to excise taxes. Delivery dates are estimated and cannot be guaranteed.

DESIGN CHANGES

Bausch & Lomb reserves the right to make changes in instrument design in accordance with scientific progress, and to supply apparatus resultingly different from that described or illustrated in its literature.



BAUSCH & LOMB OPTICAL CO.

Rochester 2, New York, U. S. A.

Bausch & Lomb products can be obtained from the following offices as well as from distributors and dealers in the United States and in other principal countries throughout the world:

Branch Offices and Subsidiaries

NEW YORK, NEW YORK.....	Bausch & Lomb Optical Co., 730 Fifth Avenue
CHICAGO, ILLINOIS	Bausch & Lomb Optical Co., 18 South Michigan Avenue
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TORONTO, ONTARIO, CANADA.....	Bausch & Lomb Optical Co., Ltd., 16 Grosvenor Street
MONTREAL, QUEBEC, CANADA.....	Bausch & Lomb Optical Co., Ltd., 1449 St. Alexander Street
LONDON, ENGLAND	Bausch & Lomb Optical Co., Ltd., Africa House, Kingsway, W. C. 2
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